

WHAT IS CLAIMED IS:

1. An apparatus for plasma implantation, comprising:

a vacuum container defining a vacuum chamber therein;

a table provided in the chamber for supporting a

5 substrate to which an impurity is implanted;

a plasma generating element provided outside the chamber;

a first power source for applying a first high frequency electric power to the element to form a plasma in
10 the chamber;

a second power source for applying a second high frequency electric power to the table;

a first detector for detecting a condition of the plasma;

15 a second detector for detecting a voltage or a current in the table; and

a controller for controlling at least one of the first and second high frequency electric power according to the condition of the plasma detected by the first detector and/or the voltage or the current detected by the second
20 detector, thereby controlling an implantation concentration of the impurity to be implanted.

2. The apparatus of claim 1, wherein the first detector
25 detects the condition using a method selected from an

optical emission spectroscopy, a single probe method, a double probe method, a triple probe method, a laser induced fluorescence method, an infrared laser absorption spectroscopy, a vacuum ultra violet absorption spectroscopy, a laser scattering method and a quadrupole mass spectroscopy.

3. An apparatus for plasma implantation, comprising:

a vacuum container defining a vacuum chamber therein;

a table provided in the chamber for supporting a substrate to which an impurity is implanted;

a plasma generating element provided outside the chamber;

a first power source for applying a first high frequency electric power to the element to form a plasma in the chamber;

a second power source for applying a second high frequency electric power to the table;

an electrode provided adjacent the table and connected through a capacitor to the table;

a first detector for detecting a condition of the plasma;

a second detector for detecting a voltage or a current in the electrode; and

a controller for controlling at least one of the first

and second high frequency electric power according to the condition of the plasma detected by the first detector and/or the voltage or the current detected by the second detector, thereby controlling an implantation concentration of the impurity to be implanted.

4. The apparatus of claim 3, wherein the first detector detects the condition using a method selected from an optical emission spectroscopy, a single probe method, a double probe method, a triple probe method, a laser induced fluorescence method, an infrared laser absorption spectroscopy, a vacuum ultra violet absorption spectroscopy, a laser scattering method and a quadrupole mass spectroscopy.

5. A method for impurity implantation into a substrate, comprising:

positioning a substrate on a table provided within a chamber;

generating a vacuum in the chamber;

supplying an impurity into the chamber;

applying a first high frequency electric power to a plasma generating element to thereby cause a plasma so that the impurity in the chamber is implanted in the substrate;

applying a second high frequency electric power to the

table;

detecting a condition of the plasma in the chamber;

detecting a voltage or current in the table; and

controlling at least one of the first and second high
5 frequency electric power according to the detected
condition of the plasma and/or the detected voltage or
current, thereby controlling an implantation concentration
of the impurity to be implanted in the substrate.

10 6. The method of claim 5, wherein a frequency of the
power from each of the first and second power sources is
controlled in a range from 300kHz to 3GHz.

7. A device, having a member made from a substrate to
15 which an impurity is implanted by the method of claim 5.

8. A method for impurity implantation into a substrate,
comprising the steps of:

positioning a substrate on a table provided within a
20 chamber;

generating a vacuum in the chamber;

supplying an implantation impurity into the chamber;

applying a first high frequency electric power to an
element to thereby cause a plasma so that the impurity in
25 the chamber is implanted in the substrate;

applying a second high frequency electric power to the table;

detecting a condition of the plasma in the chamber;

detecting a voltage or current in an electrode
5 connected through a capacitor to the table; and

controlling at least one of the first and second high
frequency electric power according to the detected
condition of the plasma and/or the detected voltage or
current, thereby controlling an implantation concentration
10 of the impurity to be implanted.

9. The method of claim 8, wherein a frequency of the
power from each of the first and second power sources is
controlled in a range from 300kHz to 3GHz.

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10. A device, having an element made from a substrate to
which an impurity is implanted by the method of claim 8.